

## On two new Echinides from Eastern Asia.

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Amongst the Echinodermata collected during the Prussian Expedition to the East the two following species possess a peculiar interest, because they belong to genera of which numerous species are known from former geological periods, whilst they are represented at present only by single divergent species, or by none at all, according as the boundaries of the genera are enlarged or narrowed.

1. *Scutella japonica*, n. sp.

*Motsingai* (i. e. "Kitchen-shell") of the Japanese Encyclopædia.

Rounded pentagonal, above slightly convex, beneath flat. Ambulacral plates similar, nearly (but not completely) closed at the end, occupying two-thirds of the distance from the centre to the margin; the pores of the same pair are wider apart in the middle of the plate than at its central or peripheral extremity; the furrows uniting the pores of each pair are everywhere distinctly marked. From the end of each ambulacral plate two diverging rows of three or four distant single pores run towards the margin. The margin is rounded; *the anal orifice is situated in the margin*, directed a very little upwards. The furrows of the lower surface divide within the first third of the distance from the mouth to the margin into two branches, which diverge at an angle of about  $30^\circ$ , and each of which again forks twice or three times quite close to the margin. Four genital pores, at equal distances from the centre, like the commencement of the ambulacral plates. Upper surface densely granulated; lower surface set with rather larger tubercles, each of which is surrounded by an impressed space. Colour dark violet above and below. Spines short, cylindrical, of a silky lustre; the lower ones longest (up to 2 mill.). In the interior, near the margin, from five to seven uniting walls between the upper and lower walls.

Diameter 67, height 8 millimètres.

*Hab.* Japan, in the Mississippi Bay within the Gulf of Jedo, upon a shallow sandy bottom near the shore. Many specimens were found.

The figure cited in the Japanese Encyclopædia represents the ambulacral plates and the ventral furrows in a recognizable manner, so that there is no doubt as to what it is meant for, although an important character, namely, the position of the anal orifice, is not represented.

The present species constitutes an intermediate form between the genera *Scutella*, *Scaphechinus*, and *Echinarachnius*; it might be regarded as forming a separate genus with as much right as the two latter; but just this combination of characters counsels us rather to diminish than to increase the number of genera. *Scutella japonica* agrees in the position of the anal orifice with *Echinarachnius* (and *Scaphechinus*) as opposed to *Scutella*, in the ramification of the ventral furrows with *Scutella* and *Scaphechinus* as opposed to *Echinarachnius*, and, lastly, in the circumstance that the ambulacral plates are situated in the same plane with the interambulacral spaces,

with *Scutella* and *Echinarachnius* in opposition to *Scaphechinus*; but a shallow impression in the middle line of the interambulacral spaces forms a slight indication of the difference of level in *Arachnoides*, which *Scaphechinus* resembles in this respect.

The anal orifice in many *Scutellæ*, although situated on the lower surface, is yet quite close to the margin (*e. g.* in the Miocene *S. subrotunda*, Lamk.); and Agassiz, in characterizing this genus, in 1847, in his 'Catalogue raisonné des Echinides,' says, "Anus marginal or inframarginal;" so that we should not be justified in establishing a new genus only because the anus is removed quite into the margin: but it is nevertheless remarkable that our *Scutella* precisely agrees with *Echinarachnius* and *Scaphechinus* (both of which belong to the present period and to the temperate zone) in the position of the anus, in opposition to all the Tertiary *Scutellæ* with which we are acquainted. Consequently, whilst *Echinarachnius*, notwithstanding its simple ventral furrows, is closely allied to the *Scutellæ* through *Scaphechinus* and *Scutella japonica*, the existing tropical genus *Arachnoides*, Ag. (the only species of which, *A. placenta*, Linn., I have collected at Timor), remains further removed from them, not only by the acute margin, the position of the anus above the margin, and the elevation of the ambulacral zones over the interambulacral spaces, but also, as Prof. Beyrich indicated to me, by the remarkable retrogression of the interambulacral plates upon the lower surface, inasmuch as these (leaving out of consideration the innermost circle, nearest to the mouth) occur only at the margin, and of small and unequal size. The short description of *Scaphechinus mirabilis*, A. Agass. (Proc. Acad. Nat. Sci. Philad. 1863, p. 359), contains nothing contradictory to our species, except the comparison with *Arachnoides* with regard to the difference of level between the ambulacral and interambulacral spaces: I am therefore inclined to regard that species as most nearly allied to mine; and *Scaphechinus* (as also *Echinarachnius*) as a subgenus of *Scutella*, the characters of which, occurring more prominently in the only species hitherto known, pass through *Scutella japonica* into those of the genus *Scutella*.

## 2. *Nucleolites epigonus*, n. sp.

Shell flat, oval, covered with uniform (spinigerous) tubercles, each of which is surrounded by an impressed space. Lower surface slightly concave; buccal orifice near its middle (at  $\frac{6}{11}$ ths of the length), elongate-oval, its margin turned inwards, smooth; no trace of an ambulacral star round it, except that the direction in which the ambulacral zones run may be detected in the arrangement of the tubercles and in scarcely perceptible depressions of the surface. Anal orifice elongate-oval, situated in the inflated posterior side of the Urchin, nearly vertical, only a little inclined upward, above the margin, but not extending upon the dorsal surface; a short, broad, channel-like excavation passes from it to the inferior margin. Ambulacral plates uniformly narrow, not closed, reaching half the distance between the vertex and the periphery, the two posterior ones a little longer; in these also it may be more distinctly seen than in

the others that they are each continued as two whitish streaks, but without pores, to the periphery, and beyond this towards the mouth. The pores of the same pair are united by very shallow furrows, which can be seen distinctly only in particular spots. Ambulacral plates at the same level as the interambulacral spaces; the posterior interambulacral space presents in its median line a very faint ridge-like edge, running from the vertex to the upper margin of the anal orifice.

Length 17, breadth  $13\frac{2}{3}$ , height 8, longitudinal diameter of mouth 2 millimètres.

*Hab.* The island of Adenare, at the eastern end of Flores (between Java and Timor). One specimen found, thrown up on the beach.

The only species of this genus previously known (*Nucleolites recens*, M.-Edw., from Australia) is distinguished essentially by a deep furrow in the posterior interambulacral space in which the anal orifice is situated, as also by its broader form, from our species, in which the short channel beneath the anus is the only indication of the above-mentioned furrow. We know, however, numerous species, from the Jurassic, Cretaceous, and Tertiary periods, with and without furrows uniting the ambulacral pores: most of them have the anal orifice placed higher up; but even in this respect the well-known *N. neocomensis*, Ag., agrees with our species, as indicated by the specimens in the Palæontological Collection here. The statement, "anal orifice superior," or "on the dorsal surface," which is to be found in most books among the characters of this genus, may therefore be expressed more accurately as follows:—"Anal orifice above the periphery." Desor, in his most recent elaboration of the Echinides (*Synopsis des Echinides fossiles*, 1858), divides the genus *Nucleolites* into two, according as the ambulacral pores of each pair are united by a furrow (*Nucleolites*) or not (*Echinobrissus*). The shallow, hardly perceptible furrows of the present species do not justify any such division.

I may take this opportunity of remarking that a younger specimen of *Oreaster armatus*, Gray, described by me in the 'Monatsbericht' for January 1865, p. 156 (see *Annals*, p. 433) has been described and figured by Möbius, under the name of *Goniodiscus conifer*, in the 'Abhandlungen der naturwissenschaftlichen Gesellschaft zu Hamburg,' Band iv. The difference in the determination of the genus is explained by the fact that (as Lütken has already stated, and as I find to be the case in the Indian species, of which I have series of different ages) in young specimens of *Oreaster* both the inferior and superior marginal plates assist in forming the margin—a character which is permanent in *Goniodiscus* and *Astropecten*, but undergoes a change with growth in *Oreaster*.—*Monatsber. Akad. Wiss. zu Berlin*, March 1865, p. 140.

#### *A New American Silkworm.*

After numerous experiments, Mr. L. Trouvelot, of Medford, Mass., has succeeded in rearing, and in great numbers, *Attacus Polyphemus*, Linn., and in preparing from its cocoon an excellent quality of silk,